

Musculoskeletal System Problems in Dental Practitioners

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ABSTRACT

Aim: In this study, it was aimed to evaluate the musculoskeletal system problems encountered by dentists working in an oral and dental health center in Kocaeli, Turkey.

Methods: This cross-sectional study including 74 dental practitioners was carried out in 4 Oral and Dental Health Centers in Kocaeli between 15-31 January 2020. A questionnaire was used for data collection. The questionnaire consisted of two sections. The first section concerned the sociodemographic characteristics of the subjects whereas the second section consisted of the Extended Nordic Musculoskeletal Questionnaire. Descriptive statistics are presented as mean ($\pm$) standard deviation, frequency distribution, and percentage. The Chi-square test was used to compare categorical variables.

Results: In the study, 70.3% of the subjects were female, 40.5% were aged over 41 years of age, and the average age was 38.1 $\pm$ 9.4 years. It was determined that 78.4% of the dental practitioners reported pain in their necks, 50.0% in their shoulders, 67.6% in their backs, 63.5% in wrists and hands, and 68.9% in their lower backs. Moreover, the participants reported experiencing pain severe enough to affect their personal or work lives within the last 12 months in their necks (44.6%), shoulders (23.0%), backs (33.8%), hands and wrists (41.9%), and lower backs (43.2%).

Conclusion: In the study, it was found that dentists have a high frequency of musculoskeletal problems. It is recommended that dentists work in a seated position and exercise between studies.

Keywords: dentists, musculoskeletal diseases, ergonomics

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Introduction

The profession of dentistry is a high-risk job due to the high physical activity in the working environment (1). Dentistry is demanding in working conditions and involves poor body positions and repetitive use of hands and fingers. This situation causes musculoskeletal problems to increase with stress (2,3). We can divide physical factors into 3 groups in musculoskeletal problems in dentists. These are the working environment, excessive use of hands, and body position (4). Musculoskeletal diseases are common in dentists. These occur with problems in the musculoskeletal system, such as limbs, neck, back, and waist, due to long-term exposure (5). Although there are studies of musculoskeletal problems in dentistry, it is important to monitor this situation with new studies. Cross-sectional studies at the provincial level are among the studies that need to be done to see these results. In our study, it is aimed to evaluate the musculoskeletal system problems of dentists working in the oral and dental health center in Kocaeli.

Methods

The research is a cross-sectional type of study. It was carried out in 4 Oral and Dental Health Centers in Kocaeli between 15-31 January 2020. A total of 99 dentists work in these Oral and Dental Health Centers. The study was conducted with 74 dentists who agreed to participate in the study (transportation percentage 74.7%). A questionnaire was used in the research. The questionnaire consists of two parts. The first part consists of socio-demographic characteristics, and the second part consists of the Extended Nordic Musculoskeletal System questionnaire (NMQ-E) (6,7). The validity-reliability study of the NMQ-E was conducted in Turkish (8). The purpose of NMQ-E is the evaluation of waist, neck, shoulder, and general musculoskeletal complaints with standardized questions. In NMQ-E; Disturbances in nine specific mapped and marked areas of the body (feet-ankles, knees, thighs-hips, wrists-hands, waist, elbows, back, shoulders, neck) in the last 12 months, last month, and last seven days are questioned as present/absent.

Research data were evaluated with SPSS 22.0.

Descriptive statistics are presented as mean ($\pm$) standard deviation, frequency distribution, and percentage. The Chi-square test was used to compare categorical variables. The statistical significance level was taken as $p < 0.05$ in the analysis. Ethics committee approval of the study was received from Health Sciences University Kocaeli Derice Training and Research Hospital Clinical Research Ethics Committee (No: 2019-132).

Results

Within the scope of the research, 74 dentists were reached. In the study, 40.5% of the participants ($n=30$) were 41 years old and above, 32.4% ($n=24$) were between 31 and 40 years of age, with a mean age of 38.1 ± 9.4 years, and a median age of 37.5 (min:24; max:63). Of the dentists, 70.3% ($n=52$) were female, 58.1% ($n=43$) were married, 27.0% ($n=20$) had chronic disease, 28.4% ($n=21$) regularly used medication, 60.8% ($n=45$) had a body mass index between 18.5-24.9, 18.9% ($n=14$) smoked, 16.2% ($n=12$) exercised regularly, 59.5% ($n=44$) had the support of the working chair, 21.6% ($n=16$) were sitting continuously and 9.5% ($n=7$) was constantly working in standing position. The average working time of the participants is 14.4 ± 9.5 , and the average number of patients per day is 30.9 ± 9.5 (Table 1).

In the study, 78.4% of the dentists ($n=58$) had pain on their neck, 50.0% ($n=37$) on their shoulders, 67.6% ($n=50$) on their backs, 28.4% ($n=21$) in the elbow, 63.5% ($n=47$) in the hand/wrist, 68.9% ($n=51$) in the lower back, 23.0% ($n=17$) in the hip/thigh within the last year. The pain was found in the knee at 33.8% ($n=25$) and in the foot/ankle at 17.6% ($n=13$) in the last year (Table 2).

In the study, the home/work life of 44.6% ($n=33$) of the participants affected by neck pain, 23.0% ($n=17$) by shoulder pain, 33.8% ($n=25$) by back pain, 8.1% ($n=6$) by elbow pain, 41.9% ($n=31$) by hand/wrist pain, 43.2% ($n=32$) by lower back pain, 14.9% ($n=11$) by hip/thigh pain, 14% 9 ($n=11$) by knee pain, and 2.7% ($n=2$) by foot/ankle pain in the last 12 months (Table 3).

Table 1. Distribution of the socio-demographic characteristics of dentists

	n (%)
Age	
30 years and under	20 (27.0)
31-40	24 (32.4)
41 years and older	30 (40.5)
Gender	
Male	22 (29.7)
Female	52 (70.3)
Marital Status	
Married	43 (58.1)
Single	31 (41.9)
Have chronic disease	
Yes	20 (27.0)
No	54 (73.0)
Continuous Drug Use Status	
Yes	21 (28.4)
No	53 (71.6)
Body Mass Index	
< 18.5	3 (4.1)
18.5-24.9	45 (60.8)
25-29.9	20 (27.0)
≥ 30	6 (8.1)
Smoking Status	
Never smoked	46 (62.2)
Smoked. quit	14 (18.9)
Still smoking	14 (18.9)
Doing Regular Exercise	
Yes	12 (16.2)
Occasionally	49 (66.2)
No	13 (17.6)
Does the work seat have support?	
Yes	44 (59.5)
No	30 (40.5)
Sitting-work status	
Occasionally	20 (27.0)
Often / usually	38 (51.4)
Continuous	16 (21.6)
Standing work status	
Occasionally	59 (79.7)
Often / usually	8 (10.8)
Continuous	7 (9.5)

Table 2. Distribution of pain conditions in dentists' body regions

	n (%)	Pain Status	
		Within the last month n (%)	Within the last year n (%)
Neck	51 (68.9)	54 (73.0)	58 (78.4)
Shoulder	33 (44.6)	35 (47.3)	37 (50.0)
Back	43 (58.1)	46 (62.2)	50 (67.6)
Elbow	16 (21.6)	16 (21.6)	21 (28.4)
Hand/Wrist	41 (55.4)	43 (58.1)	47 (63.5)
Low back	43 (58.1)	46 (62.2)	51 (68.9)
Hip / Thigh	11 (14.9)	14 (18.9)	17 (23.0)
Knee	20 (27.0)	21 (28.4)	25 (33.8)
Foot / Ankle	12 (16.2)	12 (16.2)	13 (17.6)

Table 3. Distribution of dentists' features related to pain in the body regions in the last year

	Affecting Home / Business Life n (%)	Going to the doctor's n (%)	Drug use n (%)	Getting a report n (%)
Neck	33 (44.6)	19 (25.7)	22 (29.7)	7 (9.5)
Shoulder	17 (23.0)	8 (10.8)	10 (13.5)	3 (4.1)
Back	25 (33.8)	10 (13.5)	16 (21.6)	6 (8.1)
Elbow	6 (8.1)	5 (6.8)	5 (6.8)	1 (1.4)
Hand/ Wrist	31 (41.9)	15 (20.3)	17 (23.0)	7 (9.5)
Low back	32 (43.2)	16 (21.6)	19 (25.7)	5 (6.8)
Hip / Thigh	11 (14.9)	6 (8.1)	6 (8.1)	2 (2.7)
Knee	11 (14.9)	6 (8.1)	5 (6.8)	-
Foot / Ankle	2 (2.7)	-	-	-

In the study, no statistically significant difference was found between dentists' neck pain status in the last year according to age, gender, chronic disease status, and sitting status ($p=0.349$, $p=0.442$, $p=0.089$, $p=0.930$, respectively). No statistically significant difference was found between having back pain in the last 12 months with age, gender, presence of chronic disease, sitting and standing status ($p=0.207$, $p=0.311$, $p=0.160$, $p=0.690$, $p=0.324$, respectively) (Table 4).

Table 4. Distribution of neck and back pain conditions in the last year according to the socio-demographic characteristics of dentists

	Neck		Back	
	n (%)	p	n (%)	p
Age				
30 years and under	17 (85.0)	0.349	16 (80.0)	0.207
31-40	20 (83.3)		17 (70.8)	
41 years and older	21 (70.0)		17 (56.7)	
Gender				
Male	16 (72.7)	0.442	13 (59.1)	0.311
Female	42 (80.0)		37 (71.2)	
Have chronic disease				
Yes	13 (65.0)	0.089	11 (55.0)	0.160
No	45 (83.3)		39 (72.2)	
Sitting-work status				
Occasionally	16 (80.0)	0.930	12 (60.0)	0.690
Often / usually	30 (78.9)		27 (71.1)	
Continuous	12 (75.0)		11 (68.8)	
Standing work status				
Occasionally	47 (79.7)	0.024	41 (69.5)	0.324
Often / usually	8 (100)		6 (75.0)	
Continuous	3 (42.9)		3 (42.9)	

There was no statistically significant difference according to age, gender, chronic illness and outpatient status, with having low back pain in the last 12 months ($p=0.191$, $p=0.235$, $p=0.492$, $p=0.329$, respectively). There was no statistically significant difference between having back pain in the last 12 months with age, gender, chronic disease status, sitting and standing status ($p=0.985$, $p=0.297$, $p=0.872$, $p=0.862$, $p=0.929$, respectively) (Table 5).

Table 5. Distribution of pain situations in the low back and hand/wrist regions in the last year according to socio-demographic characteristics of dentists

Demographic characteristics of dentists				
	Low back		Hand/Wrist	
	n (%)	p	n (%)	p
Age				
30 years and under	17 (85.0)	0.191	13 (65.0)	0.985
31-40	15 (62.5)		15 (62.5)	
41 years and older	19 (63.3)		19 (63.3)	
Gender				
Male	13 (59.1)	0.235	12 (54.5)	0.297
Female	38 (73.1)		35 (67.3)	
Have chronic disease				
Yes	15 (75.0)	0.492	13 (65.0)	0.872
No	36 (66.7)		34 (63.0)	
Sitting-work status				
Occasionally	9 (45.0)	0.025	12 (60.0)	0.862
Often / usually	30 (78.9)		24 (63.2)	
Continuous	12 (75.0)		11 (68.8)	
Standing work status				
Occasionally	43 (72.9)	0.329	38 (64.4)	0.929
Often / usually	4 (50.0)		5 (62.5)	
Continuous	4 (57.1)		4 (57.1)	

Discussion

In our study, 78% of dentists were found to have neck pain in the last 12 months. In a study conducted on dental hygienists by Hayes et al (9), 84% were found to have neck pain. In the study conducted on dentists by Aghilinejad et al (10), it was found that 92% had neck discomfort in the last year. In the study conducted by Sakzewski and Naser-ud-Din (11), 66% of dentists had pain in their necks. In a study by Soyulu and Altindis (12) on dentists, it was determined that 78% had neck problems. In a study by Sarwar et al (13), on dentists, it was found that 45% had pain and 25% had neck problems as musculoskeletal problems. In a study by Alnaser et al (14), on dentists, it was

determined that 48% of dentists experienced work-related musculoskeletal disorders in the last 12 months, and 27% had problems in their necks. In a study by Harris et al (15), on dental hygienists, the most common pain area reported was the neck with 60%. In a study by Zorlu et al (16), on dentists, it was found that 60% of them had complaints from the neck region in the last 12 months. In a study by Hekimoglu et al (17), on dentists, the rate of complaining about musculoskeletal disorders was 84% in total, and neck complaints were 52%. In a study by Shah et al (18), on dentists, 78% reported musculoskeletal symptoms in different body parts in the last 12 months. The most common complaint of the participants was neck pain with 48%. In a study by Büyükbayram et al (19), on dentists, 67% of dentists reported that they had musculoskeletal disorders. Studies show that neck pain is seen within a high frequency in dentists.

In the study, 67% of the participants were found to have back pain in the last 12 months. In a study conducted by Al-Ali and Hashim (20) with dentists, it was found that 49% had back pain. In a study conducted by dentists in Croatia by Vodanovic et al (21), 78% were found to have back pain. In the study conducted by Hayes et al (9) 61% of them were found to have problems with their back. In the study conducted by Aghilinejad et al (10) 69% were found to have back discomfort. In the study conducted by Soyulu and Altindis (12) 55% of them were found to have problems with their back. In a study by Harris et al (15) on dental hygienists, it was determined that 38% had upper back pain. In the study by Zorlu et al (16) on dentists, it was found that 55% of them had complaints in the upper back region.

In the study, 68% of the dentists who participated in the study had pain in their lower back. In the study conducted by Vodanovic et al (21) 76% were found to have low back pain. In the study conducted by Vakili et al (22) on academic dentistry staff, 40% of them had lower back pain. In the study conducted by Hayes et al (9) 68% had low back discomfort. In the study conducted by Sakzewski and Naser-ud-Din (11), 60% of them had pain in the lower back. In a study conducted by Soyulu and Altindis (12), it was

determined that 56% of them had a problem in the lower back. Dentists working in different positions may have caused the frequency of low back pain. In a study by Alnaser et al (14) on dentists, it was determined that 27% of them had a problem in the last 12 months. In the study by Harris et al (15), 36% of them were found to have low back pain. In the study by Hekimoglu et al (17), it was determined that 48.9% of them had low back problems. In the study by Shah et al (18), it was found that 46% of them had low back pain in the last 12 months.

It was found that 63% of the participants in the study had pain in the hand/wrist in the last year. In the study conducted by Vodanovic et al (21), it was found that 75% of them had hand or finger pain. In the study conducted by Vakili et al (22), it was determined that 24% had hand pain. In the study conducted by Hayes et al (9), 60% of them were found to have hand/wrist discomfort. In a study conducted by Nochostin and Zafarmand (23) on dentists, it was determined that 29% had problems with the hand/wrist. In the study conducted by Aghilinejad et al (10), 56% of them were found to have hand/wrist discomfort. In the study by Alnaser et al (14), 10% of them were found to have hand/wrist problems. In a study by Harris et al (15), it was determined that 36% of them had right wrist/hand pain. In the study by Shah et al (18), it was found that 10% of them had hand/wrist pain. The fact that dentistry involves fine movements and repetitive procedures may have caused this situation.

And the study determined that 25% of the dentists went to the doctor because of neck pain, 21% for low back, 20% for hand/wrist, and 13% for back pain. In the study conducted by Vodanovic et al (21), it was

found that 34% consulted a doctor due to low back, and 30% shoulder, back, hand, or finger pain. In the study by Kara et al (24) on dentists, 16.6% of the participants stated that they had applied for any suspected occupational disease in the professional process. 50.0% of the applications were low back pain, 23.1% were neck pain, 11.5% were elbow pain, 7.7% were postural disorders. In a study by Zorlu et al (16) on dentists, 28% went to a doctor for pain in the last 12 months.

In the study, 51% of the dentists stated that they work frequently/generally, 21% sitting continuously, 10% frequently/generally and 9% continuously. In the study conducted by Nochostin and Zafarmand (23), 77% of dentists work sitting and 22% standing. In a study by Zorlu et al (16), 37% of them are sitting, 22% are standing, and 40% are working in both positions. It was determined that 50% of the participants had lumbar support in their seats. In the study by Ali and Eltayeb (25) on dentists, it was determined that 29% of dentists work standing, 63% sitting, and 7% work in both positions. In the study by Ashfaq et al (26) on dentists, it was determined that 34% of them were sitting, 19% were standing, and 46% were working in both positions.

Conclusion

It was concluded that the prevalence of musculoskeletal problems is very high among dental practitioners. It is thought that standing up and not paying attention to posture may cause these results. It is recommended that dentists work sitting and pay attention to posture. However, physical exercise is recommended between studies.

References

1. Murphy DC. Ergonomics in dentistry. *NY State Dent J* 1997;63:30-4.
2. Hayes MJ, Smith DR, Cockrell DJ. An international review of musculoskeletal disorders in the dental hygiene profession. *Int Dent J* 2010;60(5):343-52. doi:10.1922/IDJ_2514Hayes10
3. Puriene A, Janulyte V, Musteikyte M, Bendinskaite R. General health of dentists. Literature review. *Stomatologija* 2007;9(1):10-20.
4. Crawford L, Gutierrez G, Harber P. Work environment and occupational health of dental hygienists: a qualitative assessment. *J Occup Environ Med* 2005;47:623-32. doi:10.1097/01.jom.0000165744.47044.2b

5. Valachi B, Valachi K. Preventing musculoskeletal disorders in clinical dentistry: strategies to address the mechanisms leading to musculoskeletal disorders. *J Am Dent Assoc* 2003;134(12):1604–12. doi: 10.14219/jada.archive.2003.0106
6. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Sorensen FB, Andersson G, et al. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Appl Ergon* 1987;18(3): 233-7. doi:10.1016/0003-6870(87)90010-x
7. Dawson AP, Steele EJ, Hodges PW, Stewart S. Development and test-retest reliability of an extended version of the Nordic Musculoskeletal Questionnaire (NMQ-E): A screening instrument for musculoskeletal pain. *J Pain* 2009;10(5):517-26. doi:10.1016/j.jpain.2008.11.008
8. Kahraman T, Genç A, Göz E. The Nordic Musculoskeletal Questionnaire: cross-cultural adaptation into Turkish has sessing its psychometric properties. *Disability and Rehabilitation* 2016;38(21):2153-60. doi:10.3109/09638288.2015.1114034
9. Hayes MJ, Smith DR, Taylor JA. Musculoskeletal disorders and symptom severity among Australian dental hygienists. *BMC Research Notes* 2013;6:250. doi:10.1186/1756-0500-6-250
10. Aghilinejad M, Mokamelkhah EK, Talebi A, Soleimani R, Dehghan N. The effect of magnification lenses on reducing musculoskeletal discomfort among dentists. *Med J Islam Repub Iran* 2016;30:473.
11. Sakzewski L, Naser-ud-Din S. Work-related musculoskeletal disorders in Australian dentists and orthodontists: Risk assessment and prevention. *Work* 2015;52:559–79. doi:10.3233/WOR-152122
12. Soylu M, Altindis S. Effect of dentist working conditions on occupational musculoskeletal system diseases. *Suleyman Demirel University Journal of Health Sciences* 2018;9(1):46-52. doi:10.22312/sdusbed.369257
13. Sarwar S, Khalid S, Mahmood T, Jabeen H, Imran S. Frequency of neck and upper extremity musculoskeletal disorders in dentists. *J Islamabad Med Dental Coll* 2020;9(3):207-11. doi:10.35787/jimdc.v9i3.404
14. Alnaser MZ, Almaqsiel AM, Alshatti SA. Risk factors for work-related musculoskeletal disorders of dentists in Kuwait and the impact on health and economic status. *Work* 2021;68:213–21. doi:10.3233/WOR-203369
15. Harris ML, Sentner SM, Doucette HJ, Brillant MGS. Musculoskeletal disorders among dental hygienists in Canada. *Can J Dent Hyg* 2020;54(2):61-7.
16. Zorlu I, Gülcan H, Açıkgöz B, Ayoğlu FN. Musculoskeletal disorders and affecting factors among dentists. *Türkiye Klinikleri J Dental Sci* 2021;27(4):531-8.
17. Hekimoğlu C, Berberoğlu U, Uysal SA, Gökşülük D, Alpar R, Baghirova N. Prevalence of musculoskeletal disorders among dentists: correlation of physical activity and burnout. *J Tradit Complem Med* 2020;3(2):150-9. doi:10.5336/jtracom.2019-71047
18. Shah SJ, Shah S, Khairnar MR, Dhole R, Wadgave U, Karagir A, et al. Risk factors of musculoskeletal problems among dental professionals in a dental institute: a cross-sectional survey. *World J Dent* 2022;13(1):35–9. doi:10.5005/jp-journals-10015-1895
19. Büyükbayram IK, Özdaş DÖ, Çukadar H, Al-Shammari S. Self- reported health problems of dentists: a cross-sectional survey. *Yeditepe J Dent* 2022;18(2):49-54. doi:10.5505/yeditepe.2022.15046
20. Al-Ali K, Hashim R. Occupational health problems of dentists in the United Arab Emirates. *International Dental Journal* 2012;62:52–6. doi:10.1111/j.1875-595X.2011.00091.x
21. Vodanovic M, Sovic S, Galic I. Occupational health problems among dentists in Croatia. *Actastomatol Croat* 2016;50(4):310-20. doi:10.15644/asc50/4/4
22. Vakili L, Halabchi F, Mansournia MA, Khami MR, Irandoost S, Alizadeh Z. Prevalence of common postural disorders among academic dental staff. *Asian J Sports Med* 2016;7(2):1-6. doi: 10.5812/asjism.29631
23. Nokhostin MR, Zafarmand AH. “Musculoskeletal problem”: Its prevalence among Iranian dentists. *J Int Soc Prevent Communit Dent* 2016;6:41-6. doi:10.4103/2231-0762.181166

- 24.Kara KT, Deveci SE, Oğuz Öncül AF. Evaluation of dentists' approach to occupational diseases and personal protective equipment usage. Kocatepe Medical Journal 2021;22:393-99. doi:10.18229/kocatepetip.729837
- 25.Ali LIES, Eltayeb EM. Risk factors of musculoskeletal problems among dentists in Khartoum locality, Khartoum state. MAR Dental Sciences 2022;4(6):1-16.
- 26.Ashfaq S, Zahra SF, Yousaf A, Khan AA, Ali F, Sabir A. Knowledge, attitude and prevalence of musculoskeletal pain among the dentists. Life and Science 2021;2(2):59-62. doi:10.37185/LnS.1.1.128